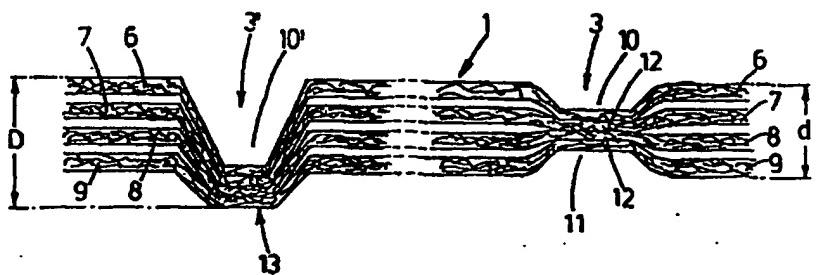




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>A47K 10/16, B31F 1/07, D21H 27/40</b>		A1	(11) International Publication Number: <b>WO 95/27429</b> (43) International Publication Date: <b>19 October 1995 (19.10.95)</b>
<p>(21) International Application Number: <b>PCT/EP95/01372</b></p> <p>(22) International Filing Date: <b>12 April 1995 (12.04.95)</b></p> <p>(30) Priority Data: <b>G 94 06 026.6 U 12 April 1994 (12.04.94) DE</b></p> <p>(71) Applicant (<i>for all designated States except US</i>): <b>VP-SCHICKEDANZ AG [DE/DE]; Schoppershofstrasse 80, D-90489 Nürnberg (DE)</b></p> <p>(72) Inventors; and</p> <p>(73) Inventors/Applicants (<i>for US only</i>): <b>REINHEIMER, Horst [DE/DE]; Imkerweg 21, D-90562 Heroldsberg (DE). HILBIG, Klaus [DE/DE]; Brucker Weg 1, D-90522 Oberasbach (DE). SCHMITT, Werner [DE/DE]; Mühlstrasse 10, D-90562 Heroldsberg (DE).</b></p> <p>(74) Agents: <b>RAU, Manfred et al.; Königstrasse 2, D-90402 Nürnberg (DE).</b></p>		<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG).</p> <p><b>Published</b>  <i>With international search report.  Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	
<p>(54) Title: <b>A CELLULOSE CLOTH FOR HYGIENE</b></p> 			
<p>(57) Abstract</p> <p>A cellulose cloth for hygiene comprises at least two layers of tissue (6, 7, 8, 9) with an embossed pattern (2, 2') consisting of a plurality of individual spot-shaped impressions (3) which deform and mutually connect the layers of tissue (6 to 9) transversely to the layer direction. The impressions (3) are formed by embossed spots (10, 11) which originate from the two outer layers of tissue (6, 9) and are curved concavely inwardly in each case and which are mutually aligned transversely to the layer direction and in whose head-to-head base regions (12) the tissue layers (6 to 9) are connected to one another by the embossing action.</p>			

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

### A cellulose cloth for hygiene

The invention relates to a cellulose cloth for hygiene with the features specified in the preamble of claim 1.

Cellulose cloths for hygiene which are known and normal, for example, as handkerchiefs, cosmetic cloths, household cloths or the like generally consist of several layers of tissue which are connected to one another by a marginal embossed pattern. Embossed patterns of this type consist of a plurality of individual spot-shaped impressions which deform the layers of tissue transversely to the direction of the layers.

These impressions are usually introduced from one side of the cellulose cloth using an embossing roller which operates against a smooth, optionally flexible, opposing roller. This mode of operation is known as random embossing. It is also possible to work with a pair of steel rollers consisting of a male-moulding roller and a female-moulding roller by the so-called union embossing process. With random embossing and also with union embossing, the impressions are curved concavely inwardly on one side of the cellulose cloth, but are correspondingly convexly raised on the other side of the cloth.

The above-described known embossing technique has various drawbacks. For example, the cloth receives a rough nature in the region of the raised impressions which considerably impairs the typical requirements for use of cellulose cloths for hygiene such as softness and skin-friendliness. To minimise these drawbacks, the impressions are limited to a narrow marginal region in known cellulose cloths for hygiene. This restricts, on the one hand, the durability of the connection between the individual layers of tissue because there are to be no embossments in the large-area central region of the cloth. On the other hand, the freedom of design of the embossed pattern which serves as a design element in addition to its connecting function is also considerably restricted.

Furthermore, the one-sided embossment of known cellulose cloths projects markedly from the back of the cloth with the result that a folded cloth with such embossments requires more space.

The object of the invention is to provide a cellulose cloth for hygiene with markedly improved embossments.

This object is achieved by the features specified in the characterising part of claim 1. A significant distinction from the prior art is that the impressions are no longer applied on one side but on both sides and are formed from embossed spots which issue from the two outer layers of tissue and are curved concavely inwardly in each case. These embossed spots are mutually aligned transversely to the layer direction, in other words rest head to head with their internal base regions with the result that the layers of tissue are connected to one another thereby by the embossing pressure.

Owing to this design of the impressions according to the invention, the cellulose cloth does not have raised embossed regions projecting beyond the outer layers of tissue. The roughening effect mentioned at the outset is therefore avoided. This means that the cloth is particularly soft and skin-friendly. Furthermore, owing to this design, the impressions can be provided in any design not only in the marginal region but virtually over the entire area of the cellulose cloth. The embossed pattern therefore represents a freely creatable design element. An embossed connection of the layers of tissue not restricted to the marginal region can also be achieved so the layered assembly of the cloth is considerably improved in comparison with the prior art. A further advantage of the cellulose cloths according to the invention is that the impressions no longer project, so the space required by a stack of folded cellulose cloths is no longer dependent on the embossment but only on the smoothness of the cloths - that is on the thickness of the layers of tissue achieved by appropriate

calendering. This means that, in practice, the volume of a conventional pack of ten cellulose cloths for hygiene can be reduced by about 20% to 50%.

Further features, details and advantages of the invention can be inferred from the sub-claims and the following description in which an embodiment of the subject of the invention is described in detail with reference to the accompanying drawings.

Figure 1 shows partial plan views of cellulose cloths for hygiene with different embossed patterns.

Figure 2 is a greatly enlarged schematic section transversely to the direction of layers through a cellulose cloth for hygiene according to the prior art and according to the invention.

Figure 3 is a schematic section through an embossing tool for a cellulose cloth for hygiene according to the invention.

Figure 4 is a schematic perspective view of embossing mounds on the embossing tool.

Figure 1 shows details of two cellulose cloths 1 for hygiene of the type used, for example, as disposable handkerchiefs. The two cloths shown have different impressions 2, 2' which are formed from a plurality of individual spot-shaped impressions 3 in both cases. The impressions 3 in the embossed pattern 2 of the cellulose cloth for hygiene 1 shown in the top left-hand corner form curved over-lapping bars. The embossed pattern 2' in the cellulose cloth 1' shown on the bottom right is formed by impressions 3 arranged in undulating lines. Both embossed patterns 2, 2' extend beyond a narrow marginal region 4 of the cloth 1, 1' into the central region 5 thereof, but the embossed patterns 2, 2' can also cover the entire area of the cellulose cloths 1, 1', not shown. The marginal region 4 determines the width to which the formerly used marginal embossed patterns are

usually restricted in cellulose cloths according to the prior art.

Figure 2 serves as further illustration of the distinction between a cellulose cloth according to the invention (shown in the right-hand part of Figure 2) and the prior art (shown in the left-hand part of Figure 2). The cellulose cloth 1 basically consists, for example, of four individual layers of tissue 6, 7, 8, 9 with a weight per unit area of about 15 g/m<sup>2</sup> in each case. The layers 6 to 9 are connected to one another by the impressions 3 with which the layers of tissue 6 to 9 are deformed transversely to the direction of the layers and are attached to one another by the embossing pressure.

As shown in the right-hand part of Figure 2, the impressions 3 in the cellulose cloth 1 according to the invention are formed in each case by two embossed spots 10, 11 which are mutually aligned transversely to the direction of the layers and curve concavely inwardly from the two outer layers of tissue 6, 9 in each case. The inner layers of tissue 7, 8 are thus enclosed. The embossed spots 10, 11 are introduced in such a way that the layers of tissue 6 to 9 are squeezed together by the embossing action in the base region 12 of the embossed spots 10, 11 and are therefore permanently connected.

The impressions 3' according to the prior art are shown in the left-hand part of Figure 2. In this case, an embossed spot 10' is introduced into the cloth from one side of the cellulose cloth, for example originating from the tissue layer 6. The cloth therefore has a convex bulge 13 on the remote side.

As demonstrated by a comparison between the left-hand and right-hand sides of Figure 2, the cellulose cloth 1 according to the invention with the embossed spots 10, 11 on both sides remains smooth on both sides as it does not have any bulges. In this respect, the cellulose cloth does not have a different front and back either, as is the case with the cloth according to the prior

art. Furthermore, the effective thickness of the cloth is not increased by the embossed spots 10, 11, as in the prior art. As shown in the left-hand part of Figure 2, the cloth according to the prior art has an effective thickness D which is substantially increased by the bulges 13 of the embossed spots 10'. The thickness d of the cellulose cloth according to the invention, on the other hand, depends only on the smoothness of the individual layers of tissue 6 to 9.

Figures 3 and 4 illustrate the embossing process for introducing the embossed spots 10, 11 into the cellulose cloth 1. A pair of embossing rollers 14, 15, which have embossing mounds 17 arranged congruently according to the respective embossed pattern on their external surface 16 in each case, is used as embossing tool. The embossing rollers 14, 15 are arranged and controlled in such a way that the embossed mounds 17 are arranged exactly head-to-head in each case but do not touch one another. Between the faces 18 of the embossing mounds 17, a distance between the faces 18 of fractions of a millimetre remains in the embossing gap 19 through which the multi-layered unembossed cellulose cloth 1 is guided. This distance is adjusted in such a way that the tissue layers 6 to 9 are squeezed together as they pass through the embossing gap 19. Furthermore, the two embossing rollers 14, 15 are produced from refined steel and are therefore inherently rigid. With an appropriately precise arrangement and control of the embossing rollers 14, 15, an embossed result is achieved which is more reproducible than in the prior art where a profiled embossing roller and a smooth flexible opposing roller into which the embossing mounds of the embossing roller are impressed are used.

As shown in Figure 4, the individual embossing mounds 17 are substantially truncated cone shaped; the transitions 21 from the external surface 16 or face 18 into the flanks 22 of the embossing mounds being smooth-surfaced and rounded. An embossing process which preserves the material is thus achieved.

Claims

1. Cellulose cloth for hygiene comprising at least two layers of tissue (6, 7, 8, 9) with an embossed pattern (2, 2') consisting of a plurality of individual spot-shaped impressions (3) which deform and mutually connect the layers of tissue (6 to 9) transversely to the layer direction, characterised in that the impressions (3) are formed by embossed spots (10, 11) which originate from the two outer layers of tissue (6, 9) and are curved concavely inwardly in each case and which are mutually aligned transversely to the layer direction and in whose head-to-head base regions (12) the tissue layers (6 to 9) are connected to one another by the embossing action.
2. Cellulose cloth for hygiene according to claim 1, characterised in that the layers of tissue (6 to 9) are squeezed together in the region of the embossed spots (10, 11).
3. Cellulose cloth for hygiene according to claim 1 or 2, characterised in that the embossed pattern (2, 2') extends beyond a marginal region (4) of the cloth (1) into the central region (5) thereof.
4. Cellulose cloth for hygiene according to one of claims 1 to 3, characterised in that the embossed spots (10, 11) are introduced into the cloth (1, 1') by a pair of embossing rollers (14, 15) with embossing mounds (17) which are arranged head-to-head and operate without mutual contact.
5. Cellulose cloth for hygiene according to one of claims 1 to 4, characterised in that the layers of tissue (6 to 9) are curved inwardly substantially in the form of a truncated cone in each case in the region of the embossed spots (10, 11).
6. Cellulose cloth for hygiene according to one of claims 1 to 5, characterised in that the layers of tissue (6 to 9) can be calendered to a thickness (d) which is independent of the impressions (3).

1 / 2

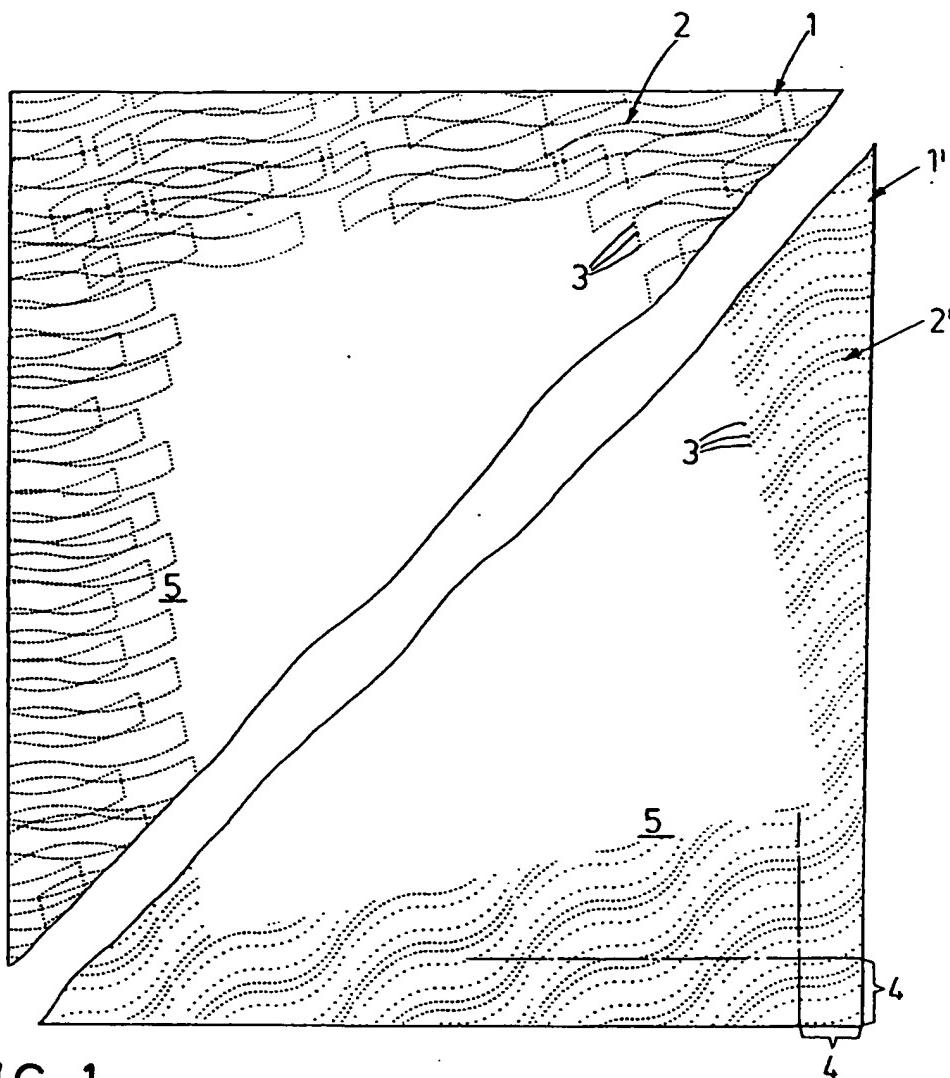


FIG. 1

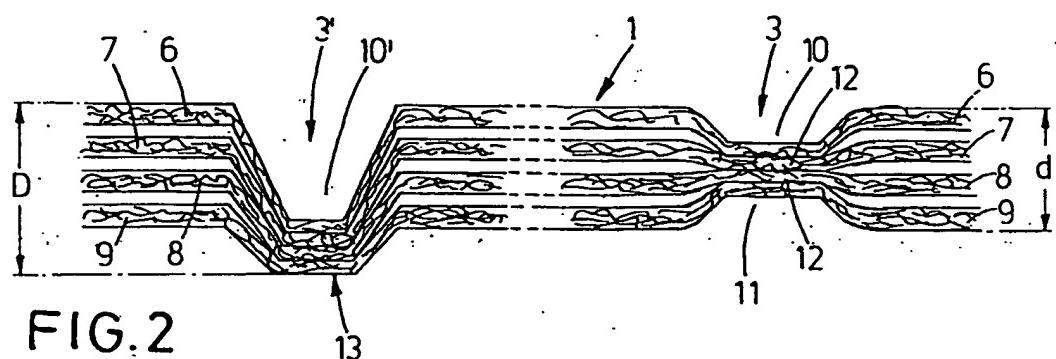
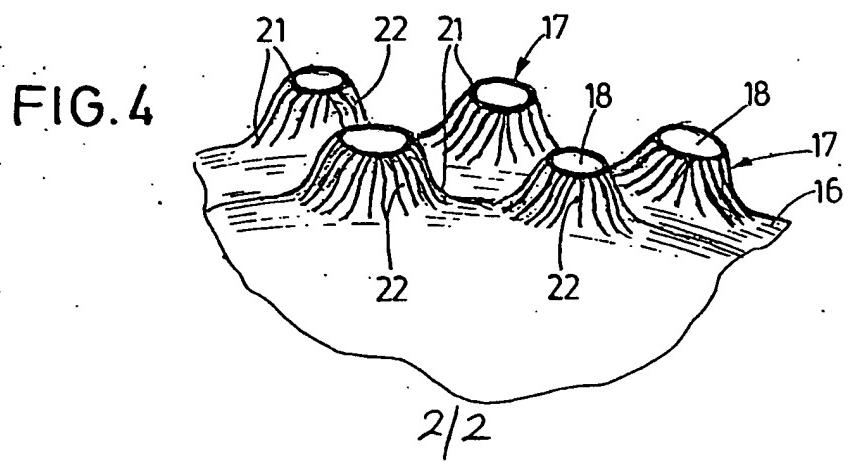
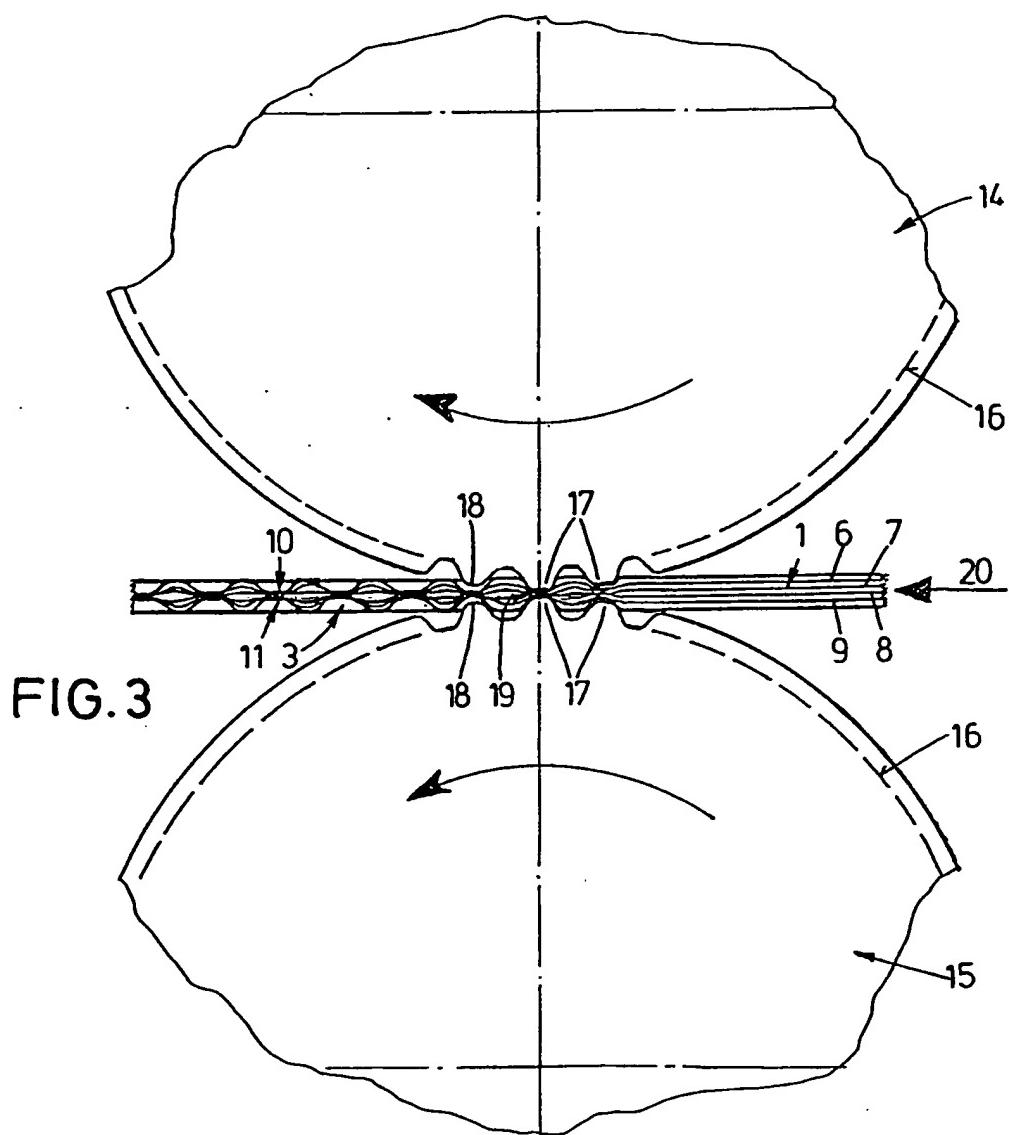


FIG. 2



## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 95/01372

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 6 A47K10/16 B31F1/07 D21H27/40

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 6 A47K D21H B31F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,92 14605 (KAYSERSBERG S.A.) 3 September 1992 see the whole document	1-6
X	NL,A,8 400 146 (KOCH CONSULTANTS B.V.) 16 August 1985 see the whole document	1-6
X	EP,A,0 265 298 (BEGHIN-SAY S.A.) 27 April 1988 see the whole document	1-6
X	US,A,3 414 459 (WELLS) 3 December 1968 see figures	1-6
X	WO,A,93 11929 (KAYSERSBERG S.A.) 24 June 1993 see figures 4,5	1-6
	-/-	

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- &\* document member of the same patent family

Date of the actual completion of the international search

26 July 1995

Date of mailing of the international search report

16.08.95

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax (+ 31-70) 340-3016

Authorized officer

Lasson, C

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 95/01372

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 436 170 (PWA WALDHOF G.M.B.H.) 10 July 1991 -----	1-6

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 95/01372

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO-A-9214605	03-09-92	FR-A-	2672843	21-08-92
		EP-A-	0572503	08-12-93
NL-A-8400146	16-08-85	NONE		
EP-A-0265298	27-04-88	FR-A-	2604734	08-04-88
		US-A-	4978565	18-12-90
US-A-3414459	03-12-68	NONE		
WO-A-9311929	24-06-93	FR-A-	2684598	11-06-93
		EP-A-	0570578	24-11-93
EP-A-0436170	10-07-91	DE-A-	3942536	27-06-91
		AT-T-	123542	15-06-95
		DE-U-	8915804	20-06-91
		DE-D-	59009207	13-07-95

**HPS Trailer Page  
for  
EAST**

---

**UserID: jfortuna\_Job\_1\_of\_1  
Printer: rem\_07c25\_gbukptr**

**Summary**

<b>Document</b>	<b>Pages</b>	<b>Printed</b>	<b>Missed</b>	<b>Copies</b>
WO009527429A1	13	13	0	1
<b>Total (1)</b>	<b>13</b>	<b>13</b>	<b>0</b>	<b>-</b>